

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

Mortars especially have been used to place masonry units more rapidly together. It is important for mortars to have the same basic characteristics as concrete in order for it to protect the units that it binds. Mortar is basically a construction material that consists of cements, sand and water. The composition of the mixture is determined during mixing and results in the fresh mortar hardening into hardened mortar. The water cement ratio is the key factor that determines the strength of the mortar, with a lower ratio yielding a stronger and more durable concrete.

When mortar hardens, it needs to achieve the level of strength and hardness that is required for a certain construction. Curing is performed so that the mortar is hydrated which lowers the permeability and increases the strength, resulting in a higher quality material. A lot of research conducted by various researchers has shown that the increase in the quality of the properties of mortar could be achieved by adding chemical admixtures. However, it must also consider a realistic budget and cost, and the affects the chemicals could have on the environment.

Furthermore, the cement forms a hard matrix which binds the rest of the ingredients together into a durable stone like material with many uses such as use to build building, apartment, tunnel, dam, bridge and other. Concrete and mortar also have own disadvantages such as weak on crack propagation and have a low impact strength.

The application and use mineral additive in cement and mortar have been widely studied and use other material to add strength on mortar such as used natural fiber as cementitious material. The investigation has been carried out using several waste

materials as cementitious material such as palm kernel shell, bamboo, rice husk, banana and other. (Rodrigo C. Kanning, 2014)

1.2 HISTORY OF MORTAR

The earliest known mortar was used by the ancient Egyptians and was made from gypsum. This form was essentially a mixture of plaster and sand and was quite soft. It was used in the mid nineteenth century, as part of scientific efforts to develop stronger mortars than existed at the time. It was popularized during the late nineteenth century, and by 1930 it had superseded lime mortar for new construction.

The main reason is hard and more quickly, that allows a faster rate of construction. However this type of mortar should not be used for the repair purpose of older buildings which constructed in lime mortar, which require the flexibility, softness and breath ability of lime if they are to function correctly. The Portland cement mortar is the basic for concrete, which known as the mixture that usually composed with particular mortar with the addition of gravel.

Meanwhile lime mortar is the mortar created by mixing sand, slaked lime, and water. The earliest known use of lime mortar dates to about 4000 before century in Ancient Egypt. Lime mortars have been used throughout the world, notably in Roman Empire buildings throughout Europe and Africa.

The vast majority of pre-1900 masonry buildings in Europe and Asia are built from lime mortar. There are two types of lime mortar which is known as non-hydraulic and hydraulic lime mortar. The hydraulic lime mortar will set very slowly and the hydraulic lime mortar will set fast. Lime mortar is considered as breathable so it can allow moisture to move freely through it and it will also let water to evaporate from its surface.

1.3 PROBLEM STATEMENT

Nowadays agriculture waste is a material from agriculture sector that can be use with different function and give many advantages in construction industries. It does not only economical but can prevent the environmental problem such as global warming.

Most all the agriculture waste is usually disposed into landfill or dispose by open burning that may cause environmental pollution.

This waste material can be used to increase the strength performance of mortar .The chemical composition are found in each plant and they are can give advantage as well as cheapest. Banana fiber ash has high potential to improve properties of material and can be used to test the performance of mortar.

1.4 RESEARCH OBJECTIVE

The main objective of this research is to determine the best cycle burning process to prove the strength performance of mortar, while the sub objective of the research are :

- i. To determine the compressive strength of mortar using banana fiber ash with 3 type cycle burning process.
- ii. To obtain the best cycle burning process to produce high strength mortar.

1.5 SCOPE OF STUDY

This study was conducted to analysis the different on 3 type cycle burning process and determines the strength of mortar using banana fiber ash. The scopes of study are:

- i. The material uses are banana fiber ash, cement, sand and water using ratio 1:3.
- ii. The banana fiber burnt in furnace and the testing of banana fiber ash burnt with 500°C.
- iii. 2% of banana fiber ash was use to replace the use of cement by weight.
- iv. A total number 27 cube with 50 mm x 50 mm x 50mm used to determine compressive strength.
- v. Curing process for 7 days, 14 days and 28 days using water curing at the Civil Engineering Concrete Laboratory (FKASA lab).
- vi. Compressive strength test was conducted to determine the strength of mortar with cycle of time about 1, 2 and 3 cycle.